

Differences between a regular and a sport automatic transmission on a LCI E6x 5-series

The transmission (regular and SAT) was introduced with the 2008 LCI facelift. It is made by ZF and the torque converter is only used to get the car moving from a stop. Once the car is moving, the gears are directly coupled to the drivetrain and the shifts occur very quickly. I don't know whether the ZF box is the one available across the whole line or restricted to the more powerful engines, i.e. 3-liter diesels and v8 gasoline engines?

A) Normal (D) mode

Putting the car in D engages the normal drive mode which is identical regardless whether you have a SportsAutomaticTransmission (SAT) or the regular automatic transmission (RegAuto). D starts in 2nd gear unless you push the throttle hard.

If you have the SAT installed, in addition to a nice leather boot around the beefier gear lever, you will also have a sport button close to the gear lever and you have a pair of steering wheel mounted shift paddles. You are able to engage a gear manually by activating the paddles (pulling for up-shift and pushing for down-shift). The selected gear will show in the instrument cluster LCD as either M1-M6. If you are not accelerating at a good clip, engine braking or holding the paddle engaged, then the car will revert to normal automatic mode after about 5 seconds and the instrument cluster LCD will again show D.

B) Drive Sport (DS) mode

Pulling the gear lever to the left, activates a more performance oriented gear change mode known as DS (Drive = Sport) mode. This is regardless whether you have the RegAuto or the SAT. The DS mode gives you:

1. Instrument cluster LCD display changes from D to DS on RegAuto. On the SAT, it changes to S1-S6 depending on which gear you are in. There are claims that it will not shift into 6th and it will indeed remain in 5th at least up to 180 km/h but I suspect it will shift into 6th when well above 200 km/h which remains to be verified at a future trip to the Autobahn; as far as I interpret this Youtube video <http://www.youtube.com/watch?v=DEUan98bDnA&feature=related> then 18 secs into the video, going 240 km/h in DS, the revs drop to about 3,400 and that indicates 6th gear to me.
2. The gearbox will up-shift at higher revs and if you lift throttle abruptly after gunning the engine, the gearbox will hold the gear and engine brake which is excellent for throttle liftoff when going through turns on a racetrack. Exact up-shift points will however depend on how hard you press the accelerator. In a 2008 E61 535D, when throttle is feathered, the car will shift in to the next higher gear at approx 1,600 rpm in normal automatic and at 2,550 rpm in DS mode. When throttle is floored, the car will shift in to the next higher gear at approx 4,500 rpm in normal automatic and at 4,750 rpm in DS mode. (This is essentially identical to what you get when you push the sport button)
3. If you push the lever forward, you enter manual mode and down-shift 1 gear. If you pull it backwards you enter manual mode and up-shift 1 gear. To exit manual mode, pull lever to the right. With SAT transmission, manual downshifting gets a slightly discernible intermediate throttle application if the sport button is engaged. It is difficult to reproduce and to find exact shift points where this consistently occurs at but I have experienced it a few times. NB the car will up-shift also in manual mode, but only if you hit the redline.

C) Engaging "Sport" mode regardless whether in D or DS mode

1. LED light in the sport button lights up and the word "sport" appears in the instrument cluster LCD
2. Faster shift times – I don't know exactly how many milliseconds but it is noticeable.
3. Steering becomes heavier. According to the BMW manual it gets more direct which would mean less steering wheel movement will yield greater steering response but in my regular steering model (i.e. not

dynamic steering) I cannot verify this. At a standstill there is slightly less than 1 ¼ turn from centered to lock regardless whether sport is engaged or not.

4. Improved throttle response – less pedal travel will yield more engine output. I don't know how many more revs you get on 1 inch of pedal travel, but it is noticeable without instruments.
5. The gearbox will up-shift at higher revs and if you lift throttle abruptly after gunning the engine, the gearbox will hold the gear and engine brake which is excellent for throttle liftoff when going through turns on a racetrack. Exact up-shift points will however depend on how hard you press the accelerator. In a 2008 E61 535D , when throttle is feathered, the car will shift in to the next higher gear at approx 1,600 rpm in normal automatic and at 2,550 rpm in DS mode. When throttle is floored, the car will shift in to the next higher gear at approx 4,500 rpm in normal automatic and at 4,750 rpm in DS mode.
6. The gearbox will be restricted to 1-5th gear and will not engage 6th gear at any time, so top speed will be restricted to around 250 km/h.
7. There's some speculation that engaging sport may affect dynamic suspension settings but this is not verified.

The above observations are to a large extent corroborated on <http://www.bimmerfest.com/forums/showthread.php?t=384390> and on http://forums.5series.net/topic/42608-rudys-full-review-of-the-2008-550i-sport-automatic/page_hl_automatic

Bottomline on SAT DS, Sport and Sport+DS. You get a more sporty feeling car when engaging DS; without getting the heavy steering of the sport mode. The raciest mode is to push Sport where you get everything from DS as well, except the gear indication. Sport+DS will show you what gear you are in but isn't otherwise faster than simply engaging Sport.

D) Other

Vmax for different gears is approx:

1st: 55 km/h

2nd: 95 km/h

3rd: 145 km/h

4th: 195 km/h

5th: 252 km/h

6th: well above 300 km/h as 300 km/h is reached at approx 4,200 rpm on the 535d which will take 4750 rpm.